Reports - Miscellaneous. No. 9.

MEDICAL ADVISORY COMMITTEE

MESOPOTAMIA INQUIRIES

REPORT ON BASRAH BASE

September 1916.

SIMLA:
PRINTED AT THE GOVERNMENT MONOTYPE PRESS.
1916.

WELLCOME
LIBRARY
General Collections
P
143

22502707327

CONFIDENTIAL.

MEDICAL ADVISORY COMMITTEE.

Mesopotamia Inquiries.

Report as to Basrah Base, September 1916.

To

Surgeon-General F. H. TREHERNE, C.M.G.,

Director, Medical Services, Mesopotamia Force.

Sir,

1. Following instructions from the War Office that this Committee should proceed to Mesopotamia, we arrived at Basrah, coming *viâ* Bombay, on September 1st. We have since been engaged on inquiries relating to the prevention of disease, partly as regards the whole Mesopotamia Force, mainly as regards the Basrah Base, area. On the latter we have the honour to submit the present report.

General nature of the Area.

2. The main part of the base area is comprised in a strip of land some 2-3 miles broad along the Shatt-el-Arab beginning below the town of Ashar and extending about 7 miles above it to Gurmat Ali, where the new channel of the Euphrates enters. This strip includes the native town of Ashar (estimated civil population on Captain Bishop's recent census 11,200), the town of Basrah (13,700, by the same census), about 2 miles inland from Ashar, and some small native villages. Elsewhere the country consists of stretches of date-palm groves, intersected by tidal creeks and largely under water in the high river summer season, with flat desert behind. The surface soil becomes impervious in rain and sticky to a degree; roads, wharves, etc., originally hardly existed; while many other conditions also have rendered the area extraordinarily difficult to develop and organise as a place for camping, hutting and billeting troops: still more so as a great port of unloading, as a principal hospital centre and for all business of an important base.

3. At least, until quite lately, the requirements of the British occupation have been met mainly by rough improvisations, especially in matters of housing, road-making, wharves, and the like. At the present time however the area is undergoing considerable further change, as a result of the development of landing places at Magil, 3 miles above Ashar, the use of Tanooma, across the river from Ashar, the reconstruction of docks, the utilisation for camps and hospitals of Makina and other parts of the desert clear of the date-palm groves; the construction of banks and light railways, the filling up of low-lying areas, etc. All this entails the accommodation at the base of non-combatant labour drawn from many parts of the world, and in view of labour difficulties, extension and improvement of housing for imported labourers, etc., must be expected. Provision has also been made for the numerous military and civil officers required in connection with the various developments.

4. The military population of the base area necessarily fluctuates greatly; we understand it may be thought of as about 40,000—British, Indian and followers including hospital populations. We are informed, also, that apart from the important question of the future development of the town, the Basrah area is essential as a military base, and that provision has to be made for the contingency that a considerable military force may be necessary in this area for a few years at least.

Sickness in the Basrah Area.

5. It is only for recent months that we are in a position to compare the extent and causes of sickness in the base area with those in the Mesopotamia Force as a whole. The data, such as they are, confirm the impression that Basrah has contributed at least its full share to the general heavy sickness and mortality rates in the force. In the 8 weeks, July 2nd—August 26th 1916, the admissions to hospital

from the base area totalled 5,544 ; the maximum in any one week being 1,114 (July 6-12th), and the minimum 470 (August 6-12th).

6. Without statistics, however, the high sickness rate is only too apparent. Officers are daily upset by illness among the principal staff, or the disappearance of non-commissioned officers or clerks ; while the personnel of establishments is constantly undergoing unexpected and embarrassing changes. Some British units, while at the base, have lost a very large part of their personnel through transfer of sick to India. Thus the 596 Mechanical Transport A. S. C., coming about 500 strong from Alexandria last January, has, since and up to September 3rd, had 247 officers, non-commissioned officers, and men invalided to India from different causes of sickness, including malaria (38 cases) jaundice (39), effects of heat (33), dysentery, diarrhœa and enteritis (24), and enterica (3). The 2nd Norfolk Regiment at Gurmat Ali, now made up almost wholly of young men of less than a year's service coming out from home, sent 134 cases to hospital from various causes (chief of which were the dysentery and diarrhœa group, and sore throat including diphtheria) between August 6th—September 9th.

7. As a guide to the causes of sickness among British troops, we analysed 1,107 British admissions (transfers from other hospitals and ships excluded) to No. 3 B. G. H. throughout the six weeks ending August 26th. For causes operating during the first fortnight in September we analysed corresponding data from 33rd British General Hospital. We summarise from these analyses as follows :—

	1st Period.		2nd Period.	
	3 B. G. H., July 22nd—August 26th.		*33 B. G. H. August 27th—September 14th.*	
	Cases analysed.	Per cent. of total cases.	Cases analysed.	Per cent. of total cases.
Cholera	18	1·6	2	0·2
Enterica	84	7·6	21	2·3
Jaundice	47	4·2	13	1·4
Dysentery	230	21·1	140	15·8
Diarrhœa				
Enteritis				
Colicis				
Sandfly fever	79	7·2	293	33·2
Malaria	136	12·4	159	19·0
P. U. O.	54	5·0	25	2·8
Effects of heat	139	12·6	20	2·2
Debility	43	4·0	30	3·4
Other miscellaneous causes	277	25·0	177	20·0
Total cases ..	1,107*	100·7	880	100·3

*Of the 1,107 cases there were transferred to India, to the Isolation Hospital, or died, 664 or 60 per cent. and discharged to duty or to convalescent hospital (Tanooma) or convalescent camp 443 or 40 per cent.

8. It appears from these data that the largest causes of recent sickness (British troops) have been the diarrhœa and dysentery group, malaria, and effects of heat. Cases of the last named have everywhere diminished rapidly since the end of August, but, *per contra*, admissions from what is called "sandfly fever" have lately become very numerous. Fortunately this disease is of short duration, has few if any after effects, and seldom necessitates evacuation of the case to India.

9. The enterica group, jaundice, and cholera have persisted week by week during this period and still continue to occur. Basra remains the chief place in which endemic cholera appears in the Mesopotamia Force. Looking to the much greater strength of the "rest of the force" the following table illustrates this :—

	Cholera cases (British and Indian) reported for weeks ending—						
	Aug. 12th.	Aug. 19th.	Aug. 26th.	Sept. 2nd.	Sept. 9th.	Sept. 16th.	Total.
Basrah area	39	31	43	33	24	29	199
Rest of Force	17	49	17	65	27	10	185

10. Malaria is expected to diminish or disappear by mid-October, when anophelines practically have vanished. Hitherto Basrah base has been conspicuous for the amount of malaria contracted there, while much malaria occurring up-river has apparently been contracted when the men were in Basrah.

11. In the case of Indian troops and followers at the base, we have less certain data, but it appears that malaria and the diarrhœa group have been the largest causes of sickness. There has been little or no sickness from effects of heat or sand-fly fever, and hardly any scurvey, which is so widely prevalent in the Indian forces up-river. Jaundice, debility, pyorrhœa, venereal disease, and pulmonary diseases are all considerably higher in the Indian than in the British force.

12. During the coming cooler months the general sickness rates at the base may be expected to diminish considerably, in the absence of a pronounced epidemic of cholera or other disease. Among the epidemic disease which will need to be specially guarded against during this period (in addition to cholera and the diarrhæa group) are the louse-borne diseases—relapsing fever and typhus—and plague. The possibility of "trench fever" occurring must also be remembered.

13. In our inspections we have kept the prevention of the above diseases in mind, as well as the measures which it is necessary to undertake now if the sickness rate of the next hot weather is to be reduced.

Memoranda already submitted by the Committee, and scope of this report.

14. We have already, for convenience or on account of administration urgency, forwarded to the Director, Medical Services, separate memoranda on the following matters :—

1. Condition of Medical Reinforcements Camp, Basrah (September 6th).
2. State of the lines of the 56th Battery, Royal Field Artillery, at Makina, camp (September 10th).
3. Sanitary improvements needed at Gurmat Ali camp (September 10th).
4. Insanitary condition of the compound of the West African Motor Flotilla, Basrah (September 16th).
5. Bacteriological facilities and requirements at the base (September 16th).

We understand that a note is to be furnished to us on the action taken in these matters. As elsewhere, we have made various suggestions locally in the course of our visit, which need not here be discussed.

15. We propose, for convenience and brevity, to confine this report chiefly to observations on questions which seem to us prominently to need attention at this time. We are aware that by this method the report cannot give any satisfactory indication of the large amount of excellent work which has already been done

by the medical and other services in matters relating to the health of the troops at the base, or of the circumstances which hitherto have prevented action being taken in the matters on which we make suggestions. Such questions, so far as it is necessary for the Committee to discuss them, may, we think, usefully be deferred to a later report dealing with the conditions of the force as a whole.

16. The observations are arranged as follows :—

1. (*Paragraphs 17 to 21*).—Strengthening of the sanitary service.
2. (*Paragraphs 22 to 29*).—Water supply.
3. (*Paragraphs 30 to 48*).—Sanitary requirements and notes (camps, hutments and billets ; disposal of excreta, refuse and urine ; disinfection, civil sanitation ; food supply, etc., etc).
4. (*Paragraphs 49 to 54*).—Hospital.
5. (*Paragraphs 55 to 57*).—Points regarding special diseases (malaria, dysentery, etc.).
6. (*Paragraphs 58 to 59*).—Other medical matters (hospital records, laboratory requirements, etc.).
7. (*Paragraphs 60 to 61*).—General summary of recommendations.

Strengthening of the Sanitary Service.

17. We begin with this, as we became convinced in the course of our inspections that the most urgent measure for preventing sickness in the Basrah base is to secure closer and more effective attention to elementary principles and minutial of sanitation throughout the area and that, owing to the changes in personnel and to the altered conditions of the base the existing system has become quite inadequate to cope even with the requirements of the areas about Ashar and Basrah, still less with those of Magill and Tanooma.

18. We found that changes in regard to the sanitary section and other matters were being considered by the Assistant Director of Medical Services, Line of Communication, and we have conferred on the question also with the Director, Medical Services, and others. We understand that at present the administrative proposals are taking shape as follows :—

(*a*) In place of a single (No. 10) Sanitary Section for the base, with a few supplementary sanitary officers elsewhere, to divide the base area into three and appoint three separate sanitary officers, each responsible to the Assistant Director of Medical Services (Base) through the Deputy Assistant Director of Medical Services (Sanitary), giving his whole time to the duty, and having a staff of British and Indian orderlies and of sweepers, etc., sufficient in number for the requirements of the area and adjusted as the demands of the several areas change.

The areas under consideration are (1) south of Ashar Creek, together with Tanooma ; (2) north of Ashar Creek, to Robert Creek; (3) Magill and Makina.

(*b*) To obtain a section of a London Sanitary Company (1 officer and about 20 trained men) from Egypt, so that the administration may be strengthened by the addition of British inspectors already used to similar work and to dealing with native labour in Alexandria or elsewhere. These men should be invaluable as supervisors, for special inspectors of food shops, soda-water and ice-factories, and for water inspection. Probably it would be best, while distributing the men in the different areas as a kind of loan to the local sanitary Sections, to retain the unit as a whole for administrative purposes. For these they would remain under their officer commanding who in addition would be posted for special sanitary work at the base.

We are informed that, following our recommendations to the Director of Medical Services on this matter, application has already been made to the War Office for the necessary instruction.

It is important in this connection to note that men acting as inspectors must be mobile to carry out their duties well, and that they should be given means of getting about quickly by road and water. Sanitary sections should also have clerical assistance.

(*c*) Defining the areas in which the ordinary civil sanitary work is to be undertaken by the civil sanitary officer for Basrah, so as to avoid overlapping or gaps. In this connection we consider that sanitary work in the small native villages, etc., outside the actual towns of Basrah and Ashar would be much more effectively supervised, in the interests of the troops, by the sanitary section in whose area they lie. Communications on endless details between the sanitary section and the civil medical officer, Basrah, would thus be avoided.

(*d*) The port medical officer in future to give his whole time to the sanitary work of the port, which includes visits to ships on arrival in different parts of the Shatt-el-Arab, dealing with cases of infectious disease, including cholera, disinfection of ships, safeguarding their water supply and other important matters. For this work to be efficiently performed, without irritating and needless delay of ships the port medical officer should be given a steam or motor-boat as soon as possible : the distances to be covered on the river are often great and the tides have to be reckoned with.

19. We fully support the above proposals and hope they will take effect as soon as possible. To be efficient, they of course also require (*a*) effective driving power and authority on the part of the principal sanitary officer at the base and (*b*) effective support and co-operation on the part of the executive officers with whom responsibility rests for the carrying out of sanitary work in their areas ; otherwise there soon comes a stage at which the most perfect medical and sanitary organization is brought to a standstill. We were glad to learn from the I. G. C. that the great importane of (*b*) is fully realised by him. Some instances in which executive officers appeared to have treated their responsibilities for sanitation much too lightly came under our notice, and two such instances have been referred to in the separate memoranda, Nos. 2 and 4, paragraph 16, above.

20. It would be out of place here to catalogue the remediable sanitary defects which we met with in course of our inspections, and which, looked at as a whole, are the basis of the above recommendations. While fully recognising that, from a sanitary point of view, the base area has been greatly altered for the better, we came across too many examples of such defects as the following ; especially in the huts and compounds about the riverside, and in connection with houses used as billets. In almost every case they were due to the lack of sufficient trained sanitary personnel.

Latrines.—Dilapidated or faulty in pattern ; unattended to by the sweepers ; abandoned, but not boarded up.

Incinerators.—Faulty in type ; in wrong positions in regard to the latrines ; broken and not being used ; surrounded with litter of unburnt refuse.

Sweepers.—Insufficient in number and not requisitioned.

Kitchens and cooking places.—Of bad construction, and in filthy condition.

Local water storage.—In tanks or tubs, liable to contamination, and improperly chlorinated if chlorinated at all.

Hutments.—Dirty, messed with food refuse ; overcrowded.

Ditches and tidal channels outside hutments.—Full of untreated cookhouse waste, sullage water and refuse.

Neighbourhood of camps and hutments.—Ground freely fouled by natives occupying adjacent date palm areas or villages abutting on the camp.

New hutments.—Being occupied without latrine provision having been made (Magill and Tanooma).

Condemned food stuffs in bulk.—Lying about and rotting, thus forming fly nurseries on a large scale.

The supervision over places where food and drink are sold to the troops. the system of licensing food vendors and soda water and ice makers all good as far as they go, needs, in our opinion, to be more frequent and systematic.

21. Such matters as the above, trivial as they may seem in the individual instance, collectively constitute a most important factor in the causation of much of the prevalent disease, and are particularly important in connection with the diarrhœa and dysentery group, enterica, and cholera. Some suggestions bearing on their prevention by sanitary officers and sections are given in the "Sanitary Notes" below.

21*a*. Perhaps the worst spot we found in our inspections, in which we were accompanied by Lieutenant-Colonel Perry, I.M.S., newly returned after sickness to duty as sanitary officer,—was at the hutments of the Indian Marine at Ashar and their surroundings. We have not submitted a special report on it, as the direction of this force was being transferred to the I. W. T. and at a later date we made a second visit to this camp with Lieutenant-Colonel Perry and conferred on the spot with Major Lamont, R.E., D.D.I.W.T., as to the alterations needed. It is, however, important that close attention should continue to be given to this insanitary region, and generally that a sufficient medical service should be provided for an important and growing branch on which much at present depends. We have urged on this ground that a medical officer should be definitely allotted to the I. W. T. for the sanitary and other medical work of this unit.

Water Supplies.

22. Under this head we refer to—

I. The urgent need for completion of local piped supplies, obtained from the Shatt-el-Arab by pumping.

II. The appointment of a special officer for supervision and testing of local chlorination.

III. Schemes for a general water supply not derived from the Shatt-el-Arab.

23. *Local piped supplies.*—The Director of Works explained to us the approved schemes for providing 5 local piped supplies, each with an intake from the Shatt-el-Arab, whence the water is pumped to large tanks and from there delivered by pipes to smaller local supply cisterns. These supplies are to be chlorinated in the intake pipe. Local extension of these piped supplies will now be facilitated by the arrival of portable pumping engines from India.

24. Of these schemes, that for Makina is partly in operation (working with temporary tanks) those for Magill and Tanooma are approaching completion. For Ashar an old Turkish main, leading to tanks in Ashar barracks, has been relaid. On the other hand no progress has been made with the scheme for the river front area supply.

25. The above schemes will do much to relieve the short supply of water, which promised to be a serious matter in certain parts of the area during the summer. As regards purity, the water is initially dangerous in all cases, and safety depends entirely on the control and efficiency of the chlorination.

26. Accepting these schemes as the only possible solution at the moment, we would urge

(*a*) The immediate completion of the works at the water intake at Magill: sedimentation and chlorination which at present are carried out in the pontoon tanks cannot be relied on.

(*b*) The commencement of the river front area scheme without delay, also a combined scheme for the adjacent Turkish prisoners', river conservancy and I. W. T. lamps.

(*c*) We would also draw attention to the need for immediate temporary measures to improve the supply of water to 48th street, and that to No. 33 British General Hospital.

27. *Control of local chlorination.*—For some time to come many places will be left, as hitherto, to draw their own supplies from the river and bring up water in bellums or carts. The present habit of filling tanks by hand from kerosine tins which involves considerable risk of contamination, must also continue in many places. In all such cases, where the water is not boiled, effective chlorination is essential. At the laboratory of the Assistant Director, Medical Services (Sanitary) G. H. Q., care is taken to test the bleaching powder for available chlorine, which varies greatly in different consignments, so that the solutions which are made up can be supplied in labelled bottles which show the proportions to be added. But there remain many risks from carelessness in obtaining the solutions, or in adding right quantities, or in treating the water for a sufficient time. We are convinced from what we have seen, that these risks are considerable. Although no definite local outbreak of cholera or diarrhœal disease due to neglect of chlorination has come to our notice such outbreaks on a small scale may well pass unnoticed, and under present conditions might easily occur at any time.

28. We recommend that the chlorination practised throughout the whole base area should be controlled and supervised by a special officer responsible to the Assistant Director, Medical Services, Base. A map should be prepared showing every place of chlorination, for small as well as large supplies, the officer in question should see, by personal visits and by working with the sanitary sections, that in each instance the proper routine is known, the responsibility for chlorinating is fixed, and that the routine of the responsible man is known to the officer commanding of the unit or section concerned, or to the officers or non-commissioned officers in the billets. The chlorinated water should be frequently tested. The officer should be in touch with the laboratory and other work on chlorination which is carried out by the Assistant Director, Medical Services (Sanitary) G. H. Q. The supervision should extend to the water used in ice factories, soda water establishments and the like.

29. *General public water supply.*—We think the local piped supplies above referred to should only be considered as temporary makeshifts. It is risky to deal, solely by chlorination, and without filtering or storage with an essentially dangerous river water, particularly at a place where cholera endemic, where the river traffic has become so large, and where tributary creeks are specially liable to dangerous fouling. We think that adding pressure filters to these local plant without also providing considerable storage, would be a doubtful expedient and might give only a false security. It is important, in our view, to take the earliest opportunity that military conditions allow, to obtain a general supply from another source or sources; including water necessary for the towns of Basrah and Ashar. Resorting to the Euphrates and sinking deep wells have, we understand, both been considered. The discovery of an abundant supply of deep well water would be an enormous gain. There seem considerable probability that deep wells would be successful but this can only be ascertained by trying. No practical attempt, however, has been made to do this since the arrival of the force, and at present progress in this direction hangs upon the results which may be obtained by the railway corps, who are bringing out deep boring plants (one has lately arrived). We understand that the D. D. I. W. T. is also arranging for deep boring plants to be sent.

Sanitary Requirements and Notes.

30. *Sites for camps, hutments, etc.*—The occupation of sites along the river front and in the date palm areas for camps, hutments, etc., has of course been determined by necessity: no one could consider them desirable or healthy. Besides the intrinsic difficulty due to summer flooding, nature of soil, intersecting of creeks and ditches, and the like, several of these areas appear to have harboured mosquitos to an exceptional extent during the early summer, and to have been responsible for the excess of malaria at the base referred to in paragraph (10). The same applies to sand-fly (phlebotomus fever).

As land is reclaimed and bunded off, light rails are laid, and labour is secured, a greater choice of site is becoming possible, especially in the desert area on the west by Makina and the railway. Despite the drawback of sand-storms and dust this bare, wind-swept area is undoubtedly more healthy. We have evidence

that the great importance of relieving the more congested areas, and of abandoning the most unsatisfactory camps is fully realised, both in its medical and general bearings, and we need make no recommendations on the matter.

We would however lay stress on the desirability of shifting the medical reinforcements camp to a better site, as soon as possible (see our separate memorandum No. I).

31. *Huts.*—Similar considerations apply to the important question of providing new hutting, making existing huts more water-proof and also more sun-proof against next summer ; making pathways against the coming muddy season, lighting, and so on. Substantial wooden hutments are being built in some places and are doubtless preferable. But, fortunately, chatai huts of the native type, built as large reed tunnels or on framing with a double ridge roof, can be very rapidly put up and serve well for temporary use. Even in wet weather, we are informed, they can be made reasonably waterproof by an outer covering of mud and bhusa.

In connection with hutting however we would urge :—

(*a*) *Messing huts.*—For British troops, separate messing huts should be provided in all camps and wherever practicable elsewhere. The need for this has often been apparent in our inspections. We consider that the contamination of food and other consequences of the men messing in their own huts or tents may easily have been responsible for much sickness, and should be prevented in future.

(*b*) *Floors.*—More should be done to make the earth inside the huts smooth and hard, and so provide a floor which can be readily cleaned. Usually this can be done by the unit itself (see our memorandum on medical reinforcements camp, No. 1).

(*c*) *Demolitions.*—If a hut is badly dilapidated and faulty (*e.g.*, those in the Indian Marine dock, Ashar and elsewhere in the river front area) it should be demolished at the earliest opportunity and not left standing.

(*d*) *Ashar Barracks.*—The conditions of hutting and accommodation at Ashar barracks should receive attention during the cooler weather. Between July 1st and 26th of this year there were 79 cases of severe heat stroke in the barracks in the summer, and 20 deaths from heat.

32. *Billets.*—A great many officers and men are scattered about in billets, principally in Ashar. These are usually the larger native brick houses, which have been taken over ; practically no buildings have been or are being put up for the purpose. Much has been done to clean up these houses in the first instance, and to deal, as far as possible, with the usual native cess-pits. But to prevent disease they need constant daily attention to details, especially food-storage, cooking places, and cooking ; water storage, and source of water used ; conservancy, etc. Arrangements by which one sweeper is allotted to several houses are seldom satisfactory. The constant sanitary supervision necessary for the billets is one of the principal reasons for the recommendations as to the sanitary sections made above. In every house occupied by British soldiers some one officer or non-commissioned officer should take over the " household inspection " which is so very necessary, being guided by the inspector of the sanitary section. The officer commanding, sanitary section should make a point of personally visiting as soon as possible any billet which has just been taken over by men newly arrived in the country.

33. *Latrines.*—For Indian troops and followers, the usual latrine consists of compartments in each of which are two half kerosine tins. Owing to scarcity or absence of sweepers, the contents of these tins are often left a considerable time before they are incinerated ; the tins become full, and flies and hornets settle on the excreta. It is worth noting that hornets which may have become infected are constantly visiting uncovered water supplies. Only the free use of crude oil in this area prevents this nuisance and danger being much greater than it is.

The best type of Indian latrine which we have seen here is that at No. 20 I. G. H. two whole kerosine tins joined by wooden bars which slide under the

" seat " of a metal framework provided with a wooden lid. This type has the advantage of larger receptacles and of being well nigh flyproof when the lid is down. It is convenient to have a standard form of latrine for the area, and we recommend that the one above referred to should be made the stock pattern. For British troops a similar single sliding kerosine tin, with appropriate seat and self dropping lid, is suitable. We saw examples of such at No. 3 British General Hospital.

Should troops or labour corps arrive on areas unprovided with latrines (as we saw at Magill and at Tanooma) they should use temporarily pits 4 ft. deep or more kept covered by oiled boards which render them fly proof. In use, one of the boards is removed and the man squats over the opening. The board is then replaced. The pit when half full is filled up with earth well rammed down, and oiled. Elsewhere pits 10′ long and 2′ broad, covered by 14 boards of $\frac{3}{4}$ inch planking 3 ft. 4″ long and 9″ broad each provided with lifting handle have been recommended. At the base, of course, the contingency ought seldom to arise.

Such " board-trench " latrines may sometimes be useful as a permanent system in native labourers' camps. In the case of Arabs living close to camps, it may be best to provide merely an enclosed piece of ground, with incinerator, and sweeper, adopting police measures to prevent use of the ground outisde. (*Cf.* Memo. No. 3 on brickmakers at Gurmat Ali camp).

Latrines not intended to be used should be pulled down or boarded up. It is not enough to take away the tins.

British soldiers are exhorted in their printed " Health Instructions " never to forget to wash their hands after a visit to a latrine. This is not easy if no ablution place is near. In some camps tins of cresol solution were placed outside the latrine. This practice should be encouraged and a nail-brush provided as a supplementary measure.

34. *Incinerators.*—For disposal of fæces dome-shaped incinerators are usually employed. Provided sweepers are adequate in number and do their work, most of the incinerators seen serve sufficiently well for the purpose. Some, however, want reconstruction; many would be improved by having a wider chimney. Along the river front area and in connection with the billets a systematic survey of the incinerators is desirable. Here many incinerators need small alterations or repairs and some might be shifted with advantage. The approach to, and ground round, the incinerators are often littered with unburnt refuse and attract flies and hornets. A low mud wall or railing round the incinerators would often be an advantage: the sweeper being responsible that no refuse is put on the ground outside the wall. In the case of the large town incinerators the mud wall may with advantage be surmounted by wide mesh wire netting which prevents paper and debris being blown about.

For horse and mule litter the long Ruitt pattern grid incinerators as seen at Makina and the Indian transport camp, do well. We understand that it may be difficult to get sufficient iron bars to make the incinerators of this type: if so, circular open incinerators with a central cone and air inlets formed by petrol drums may be useful. The cone is built of bricks or stones, the floor of bricks or tiles, there are no walls and the four underground channels of petrol drums or kerosine cans set end to end radiate outwards from the cone like the spokes of a wheel and do not become choked by ash and refuse.

Some Horsfall destructors are said now to be available: they would be specially useful near supply depôts where food stuffs are dumped and quantities of condemned vegetables, fruit, etc., have to be disposed of.

35 *Urine disposal.*—This frequently causes difficulty. We think in the cooler months, when the ground water is low, urine pits should be useful. They can be dug down to the level of the soil water and follow the usual type. Trials are being made of such pits in the British hospital at Tanooma and at No. 20 Indian General Hospital, Basrah. Long urine troughs filled with saw dust have lately been advocated, and might be tried experimentally.

Some Crowley carts are available for conservancy work. We would not advise their use as a substitute for local incinerators of fæces, but they can if necessary be used for cartage of urine.

36 *Disposal of sullage.*—The foul greasy water from cookhouses should not be discharged direct into the creeks. It creates much nuisance and encourages other fouling of the creeks and about their banks. Grease traps should be provided and soapy and greasy water can be treated by ordinary methods ; *e.g.*, precipitation by lime or alum, or (as frequently in France) by running it into a tank or tub, adding bleaching powder drawing off the clearer liqued at a level near the base of the tank, and passing it upwards through a second tank or box containing coarse and fine filtering material. In the desert area (*e.g.*, Makina, Hyde Park Corner) difficulty is met with in getting rid of any waste liquid or effluent. The following may be suggested : (*a*) in the period of low ground water soakpits constructed like the urine pits and carried down to the water level, the sullage having been treated to remove grease, etc. ; (*b*) removal out of the camp in tanks, by carts or tramway ; (*c*) where more permanent arrangements are possible, by pumping and a pipe carried out to a suitable disposal place.

37. *Water tanks and improvised piping.*—The water in many of the local supply tanks gets intolerably hot from the sun. Roofing over the tank, or a mud or sandbag wall and roof, with an interspace allowing free circulation of air round the tanks should be useful.

Palm-tree trunks, hollowed out in the native fashion, would, we think, often be found useful as a quick means of improvising troughs, channels, and even water piping.

38. *Kitchens.*—As elsewhere we found nearly all attempts to make kitchens flyproof were unsatisfactory, and involved much waste of invaluable wire gauze. To keep out flies as far as possible the kitchens should be dark, with free open ventilation at the top part of the walls ; the door should face north. All available wire gauze should be used in making cupboards, larders, etc., which are really fly proof. Hard, even, floors should be provided wherever possible.

39. *Fly traps.*—A description of the open air fly traps successfully used in Salonica and Egypt is being circulated and specimens have been made at the R.E. Field Park. They may be specially useful if interposed between kitchens and areas which specially attract flies *e.g.*, manure dumps, latrines or native villages and huts.

40. *Cleansing food utensils.*—This is often done with creek water, or polluted soil. In British camps a trough or tub with hot water and soda for the purpose is a great advantage : it should be handy to the messing hut (paragraph 31 *a*).

41. *Bathing and drinking from creeks.*—Where, owing to shortage of water supply or otherwise, it is found that men drink from the polluted shallow creeks, a useful remedy would be furnished by placing oil drip cans over the creek so that the water is rendered undrinkable. We suggested that this should be tried at No. 1 Indian Base Depôt.

42. *Supply of sweepers and sanitary police of camps.*—We are glad to be informed that these have considerably increased. Units in some cases seem not to have applied for the sweepers to which they are entitled under the present scale on this matter they should be advised by the sanitary sections.

At camps with a constantly shifting population—*e.g.*, the base depôts—it is essential that an adequate staff of sweepers should be permanently attached to the camp, in place of a succession of temporary sweepers passing through with the drafts. We are informed by the Base Commandant that this can be secured if the officer commanding of the camp concerned makes application for a special increase in the establishment of sweepers.

In these depôts and other camps, especially those in the palm groves, there is need for active sanitary policing of the camp itself and its immediate environment and here again efficiency is impossible if the men used for the purpose are constantly changing. We understand that this also can be met by special adjustment of the establishment. These arrangements hardly seemed sufficiently understood when we visited the camps in question.

43. *Slaughter houses.*—We would specially commend the arrangements at Makina camp for slaughtering and hanging meat, and for keeping animals pending

slaughter. Similar arrangements might usefully have been made on the new slaughtering area at Ashar. We fear that the elaborate building there will be a constant source of nuisance. Slaughtering practically in the open, as at Makina, is both more cleanly and efficient. The use of the slaughter house building at Ashar for other purposes, *e.g.*, storage, might usefully be considered.

44. *Roads.*—The present roadways, including most of those laid down since the occupation are (except in the muddy season) thick with dust which is stirred up in clouds by every vehicle. The dust may sometimes be prejudicial to health when swallowed, either by carrying recent infection or by its mere mechanical action — in any case it causes great inconvenience. A striking example of this is at at No. 8, Indian General Hospital. Proper and systematic metalling is of course the only satisfactory remedy, but we suggest that where a dusty road with much traffic runs through a camp, or (as at Magill Field Ambulance) just outside a messing hut, local oiling should be tried. Experiments have shown that ordinary oiling of long stretches of road is of little use, but thorough and very frequent oiling of such special places should be of value.

45. *Sanitary measures in Basrah and Ashar* (*civil M. O.*)—We have referred above to the importance of demarcation of civil and military sanitary jurisdiction (paragraph 18). Hitherto Captain Bishop, I.M.S., has acted as civil surgeon in Basrah and Ashar and as sanitary officer for Basrah. We found that much has been done by the Military Governors in both places to secure their better sanitation and removal of refuse ; the work is developing and does not call for comment by us at this stage. Steps should be taken to improve the public incineration area (provision of walls round the incinerators, better supervision of incineration with provision of sand-riddles, and attention to the latrines. The Ashar civil slaughtering area also needs minor improvements.

Captain Bishop explained to us the system of intelligence as to infectious disease which he is trying to develop. We understand that it is impossible, except in rare cases, to press for isolation of infectious cases in the civil infectious diseases hospital, and that reliance must be placed on precautions taken at the houses.

46. *Public drinking water posts.*—The water at these posts should not be drawn by dipping the mugs, etc., into the water tubs. Some form of dipper with a handle, like that used for milk, should be improvised. Obviously these drinking water posts, and also the posts, for treating heat-stroke, have been of the greatest value to the troops.

47. *Food supply of the troops.*—Since July the revised ration scales (British and Indian) have been adopted, and new scales, designed to be less complex in working, are now about to be issued. There is little or no evidence that Indian troops on base duties, or followers at the base, have received an insufficient dietary which has produced scurvy. We have, however, been informed of some quite recent instances in which (*a*) rations supplied have been short ; (*b*) unsuitable "substitutes" have been issued (*e.g.*, atta for rice to the rice-eating Santalis) thus occasioning intestinal trouble and loss of efficiency ; (*c*) flour supplied to bakeries was deficient in baking qualities, and where adulteration was suspected. Before leaving Basrah we conferred with the Director of Supplies and Transport on the measures for preventing such occurrences, and their efficiency. We have also discussed the question of testing new methods of importing, preserving, and despatching perishable articles like fresh vegetables and fruit from the base, and the improvement of local sources of supply up the rivers particularly the question of netting fish, which we have suggested should be more extensively adopted.

Our recommendations for strengthening the control over locally purchased food and drink are sufficiently covered by the recommendations as to the sanitary sections, etc., above. The risks of disease being caused in this way should be very vigorously guarded against. A useful proposal was made some time ago to obtain for Ashar barracks a supply of fruit such as men buy in the bazaars, and get it retailed in the barracks after proper washing. We have been unable to ascertain why this could not be put into practice.

48. *Disinfection.*—A central disinfecting station, with provision for washing and dhobies is proposed. The site selected is at Robat creek, where blankets and other articles can be brought by water from the hospital ships. The scheme is important, especially in view of the probability that there will be much lousiness among the troops in the cooler season, and consequent risk of spread of typhus or relapsing fever. To meet this contingency the construction of the station should be put in the category of very urgent works in the present scramble for labour, and got in hand at once. Portable Clayton disinfectors will be used at this station. The present disinfecting station at Beit Muir has three Thresh's disinfectors.

At present, steam disinfection is available at most of the hospitals, 7 of which (3, 8, 9, 20 Indian General Hospital, 3, 33, British General Hospital; Isolation) have Thresh's disinfectors. This provision will however, be inadequate for the rapid disinfection of clothing, blankets, etc., which will be required in the larger camps if the men get lousy, and louseborne diseases appear. Magill moreover, so rapidly developing, is without any such apparatus. For these larger camps we would recommend improvised boilers, passing current steam into any suitable kind of chamber. At Magill there will no doubt be many sources of steam which could be utilised. Alternatively Serbian barrels could be obtained and distributed to the different units, or cresol tubs and ironing benches supplied.

In the event of scabies appearing, we may draw attention to the sulphur vapour method described on page 177 of the British Medical Journal for August 5th, 1916. This method is said to have been used very successfully by the French and has the advantage of making a very rapid cure.

There is a Clayton apparatus on a barge in the port, but it is at present crippled. This apparatus and barge may be urgently required at short notice at any time.

HOSPITALS.

49. In addition to the Officers' Hospital and Isolation Hospital, there are at Basrah two British General Hospitals (3 and 33, their nominal accommodation 2,040) and five Indian General Hospitals (9, 10, 8, 20, 22; total nominal accommodation 3,500. To these will be added 40th British General Hospital. "Salonica hospital" (1,040 beds) when its hutments at Hyde Park Corner are completed and 24 and 25 Indian General Hospital, stated now to be forming (1,000 beds).

50. The existing hospitals have been taxed, particularly in the summer, far beyond their nominal capacity, when large numbers of sick have been brought down the river. Some excess over nominal accommodation still sometimes arises, notwithstanding the rapidity with which cases are transferred to India. As a result of this system of evacuation these hospitals act to a large extent as casualty clearing stations, for all cases unlikely to be able to be discharged well in two or three weeks.

51. Much work in most instances remains to be done at these hospitals; *e.g.* re-hutting and making huts waterproof, improving their mud floors; rearranging the water-supply; laying dust and making raised roadways and paths against the muddy weather; securing better accommodation for orderlies and hospital personnel. The requirements are well known to all concerned; the rapidity with which they can be fulfilled depends on available labour, which in its turn depends on Headquarters' decisions as to the relative urgency of labour for railways, docks, hospitals and other constructions. We believe, however, that the nature and importance of the work required on the hospitals has been fully represented and is well realised by all concerned, and no recommendation from this committee seems needed in these matters.

52. As a whole, we found the sanitary arrangements of the hospitals very good, when regard is had to what has been practicable. Suggestions on matters of detail were made to the officers commanding in course of our inspections. No. 3 British General Hospital suffers not only from its position on the low ground by the river bank, but also from the close crowding of the huts on the site. Though this crowding of huts and patients has been unavoidable hitherto, it must be considered prejudicial to the efficiency of the hospital. We trust it will be minimised as much as possible during the cooler weather, and that the proposed reconstruction, which will

give more space will be completed before the next hot season. Nos. 9 and 10 Indian General Hospitals adjoining No. 3 British General Hospital are in much the same position in regard to undue crowding of huts.

53. The arrangements generally at the Tanooma hospital (branch of No. 33 British General Hospital for 500 beds), No. 8 Indian General Hospital and at the officers hospital, Beit Naama, appeared to us very good. At the first named we found better arrangements for the feeding and comfort of convalescents and staff than we have noticed elsewhere. The "Salonica huts" of No. 40 British General Hospital now being completed, though probably excellent for the cooler season, will require considerable alteration to meet the next hot weather.

54. *Isolation hospital.*—It is advisable to deal with this in some detail, on account of questions which have arisen concerning its situation and sufficiency. It is situated on an island forming part of the east bank of the Shatt-el-Arab, a considerable distance below Tanooma and immediately to the south of the point where the Saghir channel leaves the main river. The site is admittedly bad. Save for narrow strips along the banks of the channel and of the Shatt-el-Arab, the ground is low lying, seamed by small creeks, and at the present time largely covered by a growth of tall rushes. In the summer it becomes a veritable swamp. A great deal has been done to make the actual site of the hospital habitable. Depressions have been filled up, raised paths have been constructed, leakages through the creek banks have been stopped and a considerable area of ground has by these measures been reclaimed for building purposes, for the pitching of tents, the erection of latrines and incinerators. Roughly the main hospital site is now L shapped and it is covered by a little group of permanent brick buildings in the angle formed by the creek and river and by lines of huts along the bank of the Shatt-el-Arab. In addition frame huts are being built to serve as wards. One is already finished and occupied.

Tented camps for contact cases have been formed on outlying portions of the drier ground and have been provided with the usual accessories, latrines, etc. At no great distance are two native villages and date pickers come close to the hospital precincts for, to the immediate east, is a thick grove of date palms also traversed by irrigation channels. The hospital admits cholera cases as well as cases of the ordinary communicable diseases save those of the enteric and dysentery class and sandfly fever. At the time of our visit a certain number of diphtheria cases were under treatment. British cholera cases are accommodated in the permanent brick buildings, Indian and native cases in the chatai huts.

A small room serves as a laboratory but there is no special bacteriologist. The medical officers carry out their own laboratory examinations. In the case of cholera this has hitherto been confined to a microscopical examination of the dejecta. The water-supply is derived from the Saghir channel by means of a flexible pipe and hand pump and is sufficiently chlorinated. From the general appearance of the site one would imagine that the place was very malarious and it is true that during certain of the summer months mosquitoes are fairly numerous. Captain Dunbar, the officer commanding of the hospital, informed us, however, that in his opinion malaria was but rarely acquired locally. The attacks which he had observed amongst the staff he attributed to relapses due to old infections.

Sand flies (Phlebotomous) are common but not worse than elsewhere in the Basrah area and the incidence of sand fly fever has not been specially heavy. These observations are of special interest for it has been suggested that owing chiefly to its undesirable site and partly also to the difficulty of access to it, this hospital should be removed elsewhere.

Under present conditions, it is at times somewhat of an undertaking to get patients, especially cholera patients, conveyed to this hospital. It is easy enough to bring them down river or across river by a launch or *mahela* but if the tide is low and the creek nearly empty it is necessary to transfer them to *bellum* before they can be landed at the small staging in the creek. The process must be prejudicial to patients with cholera or other acute illness ; it will however be abolished once the river pier (for which repeated application has been made) becomes an accomplished fact ; we regard the immediate provision of this pier as essential to the efficiency of the establishment.

Taking everything into consideration and especially having regard to the large amount of work which has been accomplished, both in the way of reclaiming swamps, erecting huts and fitting out permanent buildings we are of opinion that this hospital had better remain *in situ*.

We understand that for nine months of the year the conditions are not notably worse than they are at present. It is only during the three months when flooding occurs that the state of matters is really serious while, even so, the work already accomplished has secured the actual ward buildings against inundation. Further, as we have stated, the site is not unduly unhealthy though the atmospheric conditions are very trying in the summer, possibly more so here than elsewhere owing to the excessive humidity.

If, however, it be decided to leave the hospital where it is, certain measures should in our opinion be adopted to improve matters. Most if not all of these are, we believe, under consideration.

Our recommendations are as follows :—

1. River pier to be constructed permitting of the direct landing of patients at all states of the tide.
2. Land reclamation to be continued with cutting down of reeds and filling up of all creeks whenever labour can be spared for the purpose.
3. The provision of a special hospital launch during the hot weather for the speedy and comfortable transmission of patients.
4. Installation of an electric plant so that electric fans will be available during the hot season. These are specially required in the wards situated in the permanent buildings and in the new frame hutments.
5. The establishment of a good laboratory and the appointment of a special bacteriologist familiar with cholera work. We were shown a brick building on the river bank which had been recently partly destroyed by fire. If this were renovated it would make an excellent laboratory block, isolated from the rest of the buildings. Failing this two rooms should be set aside for laboratory purposes, either in the main building or in one of the new frame huts.
6. The hospital area should be defined by a wire fence.
7. The large cook-house should be altered the wire mesh being removed from its walls and utilised for making larders, meat safes, etc., while the building itself should be shaded, well ventilated, and have its door facing north.
8. The latrine system should be modified by the introduction of the double, sliding kerosine can system now in vogue at No. 20 Indian General Hospital, Basrah. We have already put forward the last two recommendations and we understand Captain Dunbar will see to them.

The provision of a subsidiary cholera hospital on the Basrah side of the river for the reception of British and Indian cases has been mooted, especially for the reception of severe cases from the Makina and other somewhat remote areas. If so restricted we think that this would be a useful supplement to the larger hospitals.

Points relating to some special diseases.

55. *Malaria.*—It is unnecessary for us to say much as regards malaria, for the army is fortunate in having the services of Major Christophers, C.I.E., I.M.S., so well known in connection with his work on paludism and mosquitoes in India and elsewhere. He has furnished numerous reports on the subject as it concerns Basrah and we have also had the opportunity of conferring with him. The conditions as regards the seasonal prevalence of malaria in the Basrah area are peculiar, throughout a considerable part of the year (October to March) it is, save for relapse cases, practically non-existent and this state of affairs appears to be dependent chiefly on the drying up of the smaller irrigation channels in the date groves. As a result spilling with the inevitable formation of pools, puddles is entirely absent. Larvivorous fish (Haplochilus and Cyprinodon, sp ?) are present in all the creeks and channels

and the daily tidal sweep, constantly disturbing their waters is doubtless inimical to mosquito life. The chief Basrah anophelines *A. pulcherrimus* and *A. stephensi*, the latter probably the chief malaria vector, practically disappear under these conditions and it is found that it is no longer necessary to have recourse to mosquito nets or to continue quinine prophylaxis.

Conditions, however, become very different once the rising river fills the creeks to overflowing and the subsoil water makes the ground a veritable sponge. From April onwards, and especially in June and July, Basrah must be looked upon as a highly malarious spot even though, as Major Christophers points out in his Interim Report No. 5, it is by no means easy to find anopheline breeding places. In part this is due to the sealing of channels by the copious growth of Lemna ; to the gross pollution of many of the waters and to the salinity of some of them ; also to the presence, even at this time, of larvivorous fish. Adult anophelines are, however, very common and doubtless they breed out chiefly in pools formed by spills and seepage.

So far as last summer was concerned, the river front area appeared to be rather more malarious than Ashar barracks and Makina. As is to be expected, the date-grove region is worse than the actual town of Basrah.

When we come to consider the possibility of anti-mosquito measures on a large scale we are forced to recognise that, in order to be effective, these would probably have to be very extensive and consequently somewhat costly. They will be a necessary corollary of the scheme for land reclamation and town planning which must obviously be carried into effect if Basra is to become a healthy British possession.

The prophylactic measures employed with more or less success in the past, *i.e.*, the systematic administration of quinine and the use of mosquito nets, should be continued and elaborated.

We find that in many instances the order regarding quinine prophylaxis has been more honoured in the breach than the observance. We recognise the difficulties of giving full effect to it. Even, if incomplete, quinine prophylaxis is worthy of adoption in a place like Basrah.

As regards mosquito nets we have noticed that various types of nets are used. It would be well to see that none of the meshes are less than 18 holes to the linear inch and it would be an advantage to have them even smaller considering the prevalence of sand-flies. Some of the nets we saw in store had meshes of only 14 holes to the linear inch and were useless for protective purposes.

For the four weeks ending August 26th the admissions of malaria cases to Basrah hospital (not including transfers from other hospitals or ships) were—British 167, Indian 1,350. Benign tertian was most frequent with malignant tertian running it very close. Quartan infections were very rare.

55*a*. *Enterica*.—Owing to lack of bacteriological facilities in the Basrah area an extensive series of enterica cases has only been investigated at one hospital (No. 3 B. G. H.), where excellent work has been done by the bacteriologist Captain Bonney, R.A.M.C.

Of 90 cases, examined there between March and September 1916, in which the causative organism was recovered from the blood—

B. typhosus was recovered in 17, *i.e.*, 18·8 per cent.,

B. paratyphosus A recovered in 66, *i.e.*, 73·3 per cent.,

B. paratyphosus B recovered in 7, *i.e.*, 7·7 per cent.,

thus showing (as in the Mediterranean area and elsewhere) that para-typliosus A infections have markedly predominated.

Of other 356 cases, diagnosed on agglutination tests only, the infection was classed as—

B. typhosus in 76 cases, *i.e.*, 21·3 per cent.,

B. paratyphosus A in 207 cases, *i.e.*, 58·1 per cent.,

B. paratyphosus B in 73 cases, *i.e.*, 20·5 per cent.

It may be noted that of the 93 cases of typhoid fever (in the two series above), 26 had received no anti-typhoid inoculation, and 35 had been inoculated at periods between one and three years before their attack.

In only 3 cases was there record of inoculation with the new (T. A. B.) vaccine. We understand however that for various reasons it has not until quite recently been possible to push this vaccine systematically.

Now that bacteriological facilities are being extended in this area it is of great importance that every attempt should be made to confirm bacteriologically the clinical diagnosis of enterica and, as we have elsewhere recommended, we would lay stress on the prime importance of diagnosis by isolation of the causative organism from the blood or excreta (especially the former). To ensure the earliest possible bacteriological interference in these cases of pyrexia with a view to successful diagnosis by blood culture we have elsewhere laid stress on the necessity for the fullest co-operation between the hospital medical officers and the bacteriologist who should have the freest access to all cases in the wards; where however the bacteriologist is unable owing to stress of routine, to search out cases of pyrexia for bacteriological enquiry, or where material for bacteriological investigation has to be sent to some outside laboratory, the difficulty may be met by deputing one senior and experienced medical officer in each hospital to go round the cases and be personally responsible for the selection of cases suitable for bacteriological enquiry. This plan has been adopted elsewhere with success.

56. *Dysentery and diarrhœa.*—Enquiries made at hospitals in the Basrah area have shown that very little real attempt is made to differentiate between amœbic and bacillary dysentery, and in consequence there has arisen a method of treatment which besides being unnecessary seems wasteful, in that an expensive drug like emetin is administered to many cases which do not require it (see separate memorandum No. 5 on Bacteriological facilities). The general procedure seems to be to give emetin for a few days to all cases of a dysenteric nature. Because a large number of cases clear up quickly under this treatment it is assumed that the emetin has brought about this result. On the other hand, at the 8th and 20th I. G. H. all dysentery cases are treated first with magnesium sulphate and are only given emetin if the dysentery symptoms do not abate. Under this treatment the majority quickly recover and it is only in a few cases that emetin requires to be administered. This seems a preferable plan.

An investigation into the etiology of Mesopotamian dysenteries has, at our suggestion, been commenced at the laboratory of No. 3 B. G. H. where a protozoologist and a bacteriologist, specially deputed for this work, have been located. Until a sufficient number of cases have been thoroughly examined it will be impossible to state with any certainty the relative incidence of the amœbic and bacillary types but already it would appear that the bacillary form is probably the more frequent—as indeed has recently been found to be the case in the Eastern Mediterranean and Egypt where extensive series of cases have been thoroughly worked out.

It should be clearly understood by every medical officer that emetin has no specific action in bacillary dysentery. This disease often yields readily to treatment with salines or other non-specific remedies, but it should never be forgotten that, in the severe fulminating toxæmic forms which frequently lead to a *fatal* issue the use of anti-dysentery serum (of which a plentiful supply is available at the medical stores) is a most valuable adjunct to treatment. In these severe forms the serum should be given early and freely.

When it has once been decided that the dysentery is of an amœbic nature and requires emetin treatment, this should be adequate. One grain of emetin a day for two or three days may be sufficient to abolish the symptoms but not to rid the individual of his infection and to prevent relapse one grain a day for twelve days is the least that can be given with hope of success and the result is more likely to be satisfactory if an additional half a grain of emetin, preferably in keratine coated tabloids, is given each night in addition to the injection.

57. *Scurvy.*—The Indian hospitals are full of cases of this disease on their way from the front back to India. The great question here is prevention. It is clear that the cause apart from intentional acquirement of the disease is that Indian

troops, especially those furthest away from the base and lines of communication have not been receiving diet adequate in quantity or in anti-scorbutic value. The measures which are now being taken at the base have been explained to us. Beyond noting that the conditions of transport are more favourable, and promise substantial improvement in the scurvy rate in the near future, we think it best to defer observations until we have visited the corps area.

Other medical matters.

58. *Bacteriological facilities and requirements.*—Observations on this head, as regards the Basrah area, have been separately submitted. We are glad to note that some interim action has already been taken in matters there discussed. One bacteriologist has been appointed to a laboratory which will serve Nos. 9 and 10 I. G. H., and the laboratory at No. 9 is being enlarged for the purpose. As regards requisitions and stores, Major Harvey, I.M.S., Acting Assistant Director of Medical Services (San), has put forward proposals for obtaining further materials from home and India, and Assistant Director of Medical Services, G. H. Q., to receive and advise on the indents from the different laboratories.

We should add in connexion with this subject that there is a great deficiency of essential stains, chemicals, and raw material for media-making at the Basrah laboratories and that the dificiency cannot be made good from the medical stores. In these circumstances we consider that, in addition to the laboratory equipments which have just been cabled for, an urgent demand should be made for articles such as Fairchild's peptone, diagnostic serum, etc., the stocks of which are running dangerously low ; details have been given in a separate memorandum.

59. *Hospital records and notes.*—At Bombay hospitals our attention was called to the frequent—indeed the usual—absence of information regarding the medical history or treatment of sick transferred from Mesopotamia to India in the hospital ships. Inquiry on hospital ships and at the Basrah hospitals confirm this. We think that often the absence of such information must be prejudicial to the patient (*e.g.*, in doubtful febrile cases, malaria, enterica, dysentery, etc.), entailing needless repetition of laboratory work in the attempt to establish a diagnosis in the convalescent period. The same consideration applies to men coming to Basrah hospitals from other hospital units up the river. We are aware that often notes must be perfunctory and sometimes cannot be taken at all, but even in time of stress the briefest notes, as to the administration of emetin or quinine, or as to the date and place of reporting sick, or as to the temperature on a particular day may be of much value, as also any microscopical or bacteriological report, however short. We have been shown window envelopes made to accompany the patient and attachable as labels. If these are avalable in sufficient number they could be used to carry temperature charts, diet and other notes or no doubt some equivalent arrangement could be made. We are informed that an order with the above object was issued by the Director of Medical Services in June last, but evidently it has not received sufficient attention.

60. Epitome of observations on Basrah Base Area (for use in telegraphic summary).

General.—Conditions have obviously greatly improved, and difficulties being actively met.

Sickness.—Rates high, producing serious interference with daily work. Improving with advent colder weather ; causes varied ; largest figures these for diarhhœa and dysentery group ; malaria ; and effects of heat. Since mid-August effects of heat fallen but sand-fly fever greatly increased. Enterica, chiefly paratyphoid A, and cholera showed sustained prevalence up to middle September. Practically no scurvy originating at base.

Area essentially unsuitable to healthy occupation by troops and requires perpetual attention to great variety of details if disease is to be reduced.

Sanitary organisation.—Requires strengthening. Measures needed include :—

Three sanitary sections for specified areas.

Addition of trained British sanitary section from Egypt.

Whole-time port sanitary officer, with launch.

Definite allotment of responsibility between military and civil sanitary services.

Disciplinary action where needed in support of sanitary requirements.

Water supplies.—Local piped Shatt-el-Arab supplies should be immediately completed, but considered as makeshifts only.

Special officer for supervision of all local chlorination is suggested.

Public water supply from source other than Shatt-el-Arab needed ; experimental deep borings should be pressed.

General sanitary requirements.—Suggestions made in detail on various practical points, with a view to circulation of the report to all officers concerned.

Disinfection.—Proposed new central station urgently required, also repairs to floating Clayton apparatus.

Hospitals.—Generally good, supplies adequate.

Isolation hospital.—Retention on present site advised, provided specified important improvements, including pier, are undertaken.

Special diseases.—Malaria ; no new cases expected mid-October to March. Better organisation of quinine prophylaxis should be considered before April and mosquito nets above 18 holes to linear inch discarded. Dysentery, special series of laboratory investigations started ; recommendations made for more effective use of emetin and serum and avoidance of waste. Enterica ; now possible to press T. A. B. inoculation in British units. Scurvy ; preliminary inquiries made at the base but observations deferred. For all sick the available case notes should accompany the patient on transfer to new hospital or hospital ship.

Bacteriological requirements.—Additional laboratory needed for Indian hospitals and a new scheme for regulating laboratory supplies. Peptone and agglutinating sera urgently required, other stocks need replenishing.

61. In conclusion, while gratefully acknowledging the ready assistance given to us in our inquiries by many different officers, we wish specially to record our great obligations in this respect to Lieutenant-Colonel Perry, I.M.S., Deputy Assistant Director of Medical Services (Sanitary), Base, who accompanied us in our inspections, to Major Hamilton, I.M.S., at the central office of the Director of Medical Services, and to Major Harvey, I.M.S, Acting Assistant Director of Medical Services (Sanitary) G. H. Q.

We have the honour to be,

SIR,

Your obedient servants,

(Sd.) ANDREW BALFOUR, *Lt.-Col., R.A.M.C.*

G. S. BUCHANAN, *Lt.-Col., R.A.M.C.*

J. C. G. LEDINGHAM, *Lt.-Col., R.A.M.C.*

C. M. WENYON, *Lt.-Col., R.A.M.C.*

The 28th September 1916.

G. M. Press, Simla.—No. C.51(w)D.M.S.—10-11-16—200—B.A.